

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Pyrgulopsis trivialis*

COMMON NAME: Three Forks springsnail

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: October 2005

STATUS/ACTION:

- ☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status
- ☐ New candidate
- ☒ Continuing candidate
- ☐ Non-petitioned
- ☒ Petitioned - Date petition received: 11 May 2004
- ☐ 90-day positive - FR date:
- ☐ 12-month warranted but precluded - FR date:
- ☐ Did the petition requesting a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

- a. Is listing warranted (if yes, see summary of threats below)? Yes
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
- c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements; meeting statutory deadlines for petition findings or listing determinations; emergency listing evaluations and determinations; and essential litigation-related administrative and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists" in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

- ☐ Listing priority change
- Former LP: ☐

New LP: ____

Date when the species first became a Candidate (as currently defined): 10/17/2000

____ Candidate removal: Former LP: ____

____ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

____ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

____ F – Range is no longer a U.S. territory.

____ I – Insufficient information exists on biological vulnerability and threats to support listing.

____ M – Taxon mistakenly included in past notice of review.

____ N – Taxon does not meet the Act's definition of "species."

____ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails, Hydrobiidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Arizona

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Apache County, Arizona

LAND OWNERSHIP: The entire range of the species is within lands managed by the Apache/Sitgreaves National Forests of the U.S. National Forest Service (USFS).

LEAD REGION CONTACT: Susan Jacobsen, 505-248-6641

LEAD FIELD OFFICE CONTACT: Arizona Ecological Services Field Office, Mike Martinez, 602-242-0210 ext. 224

BIOLOGICAL INFORMATION: Hydrobiid snails occur in springs, seeps, marshes, spring pools, outflows, and diverse lotic (flowing) waters. The most common habitat for *Pyrgulopsis* is a rheocrene, or a spring emerging from the ground as a free-flowing stream. Three Forks springsnail habitats are isolated, permanently saturated, spring fed aquatic climax communities commonly described as ciénegas. This species was described by Taylor (1987). Firm substrates such as cobble, gravel, woody debris, and aquatic vegetation are typical. *Pyrgulopsis* snails are rarely found on or in soft sediment. Aquatic vegetation within these habitats includes watercress (*Nasturtium* spp.), *Ranunculus*, and filamentous green algae. Springsnails are commonly found among watercress. Other mollusks include *Anodonta californiensis*, *Valvata humeralis*, *Physa gyrina*, *Radix auricularia*, *Gyraulus parvus*, *Pisidium casertanum*, *P. compressum*, and *P. variabile*.

The Three Forks springsnail is an endemic species with distribution limited to the Three Forks Springs (T5N, R29E) and Boneyard Springs (T6N, R29E), spring complexes in the North Fork East Fork Black River Watershed of east-central Arizona. The springsnail is known from free-flowing spring heads, concrete boxed spring heads, spring runs, and spring seepage at these sites. Three Forks Springs consists of more than ten spring heads confined to an area of approximately 0.1 km².

Recent studies have provided some insight into habitat preferences and population sizes. Substrate particle size is an important factor affecting springsnail habitat use. Other congeners have been shown to prefer gravel and pebble substrates (Martinez and Thome, In press; Mladenka, 1992). Preliminary analysis indicates a similar substrate preference by Three Forks springsnail (unpublished data). Initial calculations during April 2002, from a single spring run at Three Forks Springs showed a total population size = 129,135 springsnails, SE = 31,511, within a habitat area of 213.09 m², and a density = 606 springsnails m², SE = 148, (unpublished data). These calculations were based on the methodology described by Seber (1982) and Cochran (1977), and although characterized by large standard errors they indicate that Three Fork springsnail populations may be large, at least seasonally.

Monitoring surveys by Arizona Game and Fish Department (AGFD), the U.S. Forest Service (USFS), and the U.S. Fish and Wildlife Service (FWS) in 2001-02 revealed a preliminary estimate of average springsnail density at the Three Forks complex (samples pooled from 3 springs) was approximately 60 snails/m² during the summer (Nelson et al, 2002). Individually, springs at Three Forks varied in snail densities from zero to nearly 300 snails/m². The preliminary estimate of average springsnail density at the Boneyard Bog complex was approximately 790 snails/m² during the summer (Nelson et al, 2002). Individual springs at Boneyard Bog varied in snail densities of approximately 90 to 9300 snails/m².

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Throughout most of the 20th century, Three Forks and Boneyard Springs have been subjected to various levels of livestock grazing. In the mid- and late 1990's, livestock were fenced out of the immediate areas containing the spring complexes, although trespass livestock may occasionally gain access to springsnail sites. Ungulate grazing can result in significant degradation of the aquatic environment and has been implicated in the extirpation of other hydrobiid snails.

Although cattle have largely been removed, free-ranging elk (*Cervus elaphus*) have access to all spring areas containing springsnails. During the summers of 1999 and 2000, USFS and FWS biologists became concerned with potential effects of elk at Boneyard Springs. Observations of elk within the Boneyard Bog livestock exclosure appear to correlate with the occurrence of elk wallows, heavy grazing of *Carex*, and soil disturbance from elk hooves within the livestock exclosure. Elk impacts at Three Forks Spring appear to be much less consequential to the riparian and aquatic habitats than at Boneyard Bog. Arizona Game and Fish Department biologists believe that although elk wallowing at Boneyard Bog may be a problem for

maintaining springhead integrity, the amount of habitat disturbed is not alarming (AFGD, 2003). Our primary concern with elk wallowing is that bank degradation of spring runs may influence substrate composition within springsnail habitats. Specifically, wallowing may result in the filling of gravel substrates with fine sediments, which appear to be less conducive to occupation by springsnails.

Three Forks Springs has also been affected by modifications of natural spring head integrity. During the 1930's concrete boxes were constructed around four of the spring heads at the Three Forks site. However, it does not appear that these modifications have negatively affected habitat suitability for the species and springsnails have been known to be locally abundant within spring boxes and associated outflows. The extirpation of springsnails from at least two concrete boxed spring heads at Three Forks Springs was noted in 2000 (USFS, pers. comm.). However, recent surveys have encountered difficulty detecting springsnails at Three Forks Springs (AGFD, pers. comm.). We are not aware of any proposed projects or management plans that would modify springsnail habitats.

B. Overutilization for commercial, recreational, scientific, or educational purposes. The Three Forks springsnail has been subjected to a limited number of scientific studies aimed at determining taxonomic and distributional status. However, these studies have not removed snails and are not believed to have had discernible effects on any population. The springsnail is not utilized for commercial or recreational purposes.

C. Disease or predation. Nonnative crayfish (*Oronectes viriles*) have invaded several spring heads within Three Forks Springs and they are known to directly prey upon aquatic invertebrates such as springsnails. Crayfish are also known to consume aquatic macrophytes and algae that springsnails rely on for grazing and egg laying. Due to its geographic isolation, the Three Forks springsnail is not evolutionarily adapted to cope with crayfish, perhaps making the species particularly susceptible to crayfish predation.

As stated above, the Three Forks springsnail is entirely absent from at least two boxed spring heads within which it was previously abundant. The extirpation of the species from these spring boxes seems to coincide with the invasion of crayfish. The effects of crayfish on springsnail populations are unknown. However, an intensive crayfish trapping program may serve to reduce unnatural predatory pressure. Crayfish are not known to occur in large numbers at Boneyard Springs.

D. The inadequacy of existing regulatory mechanisms. The Three Forks springsnail is currently not protected by any federal statutes or regulations. The springsnail is listed under Arizona Game and Fish Commission Order 42 which establishes no open season for the species. This order prohibits direct taking of the species but does not prohibit spring modification or habitat destruction.

E. Other natural or manmade factors affecting its continued existence. The North Fork East Fork Black River watershed is a popular area for public recreation such as fishing, hiking,

hunting, and wildlife viewing. Recreation affects springsnails through habitat vandalism, introduction of pollutants or other contaminants, and introduction and spread of non-native aquatic organisms. Three Forks Springs is particularly susceptible because it is adjacent to a major Forest Service road and the North Fork East Fork of the Black River, which provides good fishing opportunities. The spread of crayfish at Three Forks Springs is primarily due to “bait bucket” releases by anglers. Additionally, campers and day hikers have been known to wash dishes and other camping equipment at Three Forks Springs resulting in the introduction of detergents, bleach, and other pollutants that can impair essential physiological processes of springsnails. Boneyard Springs is less susceptible to these threats because it is more isolated with access only possible by hiking from a 4-wheel drive road.

Lastly, endemic springsnails whose populations exhibit a high degree of geographic isolation are extremely susceptible to stochastic extinction resulting from catastrophic natural disasters such as fires, floods, or changes in spring water chemistry.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED: The USFS has established a closure around Three Forks Springs to prevent unauthorized access. The AGFD has implemented a crayfish trapping program and a springsnail monitoring program.

We are currently working with the USFS, AGFD, and Nature Conservancy to develop a candidate conservation agreement for the Three Forks springsnail.

FWS staff is currently working to publish the results of field studies describing relationships between Three Forks springsnail and various habitat parameters.

SUMMARY OF THREATS: Three Forks springsnail habitats are subjected to ungulate grazing which can result in significant degradation of the aquatic environment. Nonnative crayfish have invaded several spring heads within Three Forks Springs and they are known to directly prey upon aquatic invertebrates such as springsnails. Recreation affects springsnails through habitat vandalism, introduction of pollutants or other contaminants, and introduction and spread of non-native aquatic organisms.

For species that are being removed from candidate status:

___ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1

	Non-imminent	Species	2*
		Subspecies/population	3
		Monotypic genus	4
		Species	5
Moderate to Low	Imminent	Subspecies/population	6
		Monotypic genus	7
		Species	8
	Non-imminent	Subspecies/population	9
		Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: The threats of elk and crayfish are currently being evaluated by an interagency team of cooperators. Crayfish trapping has been implemented at Three Forks springs to help alleviate any potential predatory pressure. However, efforts to exclude access by elk to springs occupied by snails have not been realized and funding to continue crayfish trapping may cease.

Imminence: In the absence of a management strategy to effectively address the threat from both elk and crayfish in a long-term fashion, we believe the immediacy of threats to be imminent. Recent difficulty locating springsnails at Three Forks Springs are troubling, but continued survey effort is needed before conclusions can be drawn.

 X Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

Is Emergency Listing Warranted? No, because the affected state and federal stakeholders are collaborating to monitor the species and habitat, alleviate the threats from crayfish and elk, and develop a conservation plan and agreement.

DESCRIPTION OF MONITORING: The Arizona Game and Fish Department currently maintains an active monitoring program for the Three Forks springsnail in cooperation with the Fish and Wildlife Service and USFS. This program has included population monitoring, habitat sampling, and removal of nonnative predatory crayfish.

A standardized monitoring protocol has been worked on by interagency cooperators. An intensive crayfish control and eradication effort at Three Forks started in the Summer of 2002. The AGFD has staff biologists working on conservation and monitoring of the Three Forks springsnail. Initial funding for AGFD to manage this mollusk was provided from a Section 6 grant, Arizona Heritage Funds, and Nongame Wildlife Checkoff Donations. Recently, AGFD has secured a State Wildlife Grant for the conservation and management of mollusks of greatest conservation need in Arizona—which will include the Three Forks springsnail.

COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Arizona. We are currently working with the USFS, AGFD, and Nature Conservancy to develop a candidate conservation agreement for the Three Forks springsnail.

Indicate which State(s) did not provide any information or comments: NA

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Date of annual review: October 2005
Conducted by: Mike Martinez